

SEQUENCE LISTING

G:\PROJETS\BIO\BIO100

<110> UNIVERSITÉ DE MONTREAL

<120> NEW METALLOPROTEASES OF THE NEPRILYSIN FAMILY

<130> BIOMEPE INC. NEPRILYSIN

<140> PCT/CA/00/00147

<141> 2000-02-11

<150> 2,260,376

<151> 1999-02-11

<160> 17

<170> PatentIn Ver. 2.1

<210> 1

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<212> PRT

<213> Homo sapiens

<400> 1

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Val Leu Val Leu Leu Leu Thr Ile Ile Ala Val Thr Met Ile Ala Leu
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Ser Ala Ala Arg Leu Ile Gln Asn Met Asp Ala Thr Thr Glu Pro Cys
 65                70                75                80

Thr Asp Phe Phe Lys Tyr Ala Cys Gly Gly Trp Leu Lys Arg Asn Val
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Ile Pro Glu Thr Ser Ser Arg Tyr Gly Asn Phe Asp Ile Leu Arg Asp
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Glu Leu Glu Val Val Leu Lys Asp Val Leu Gln Glu Pro Lys Thr Glu
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Asp Ile Val Ala Val Gln Lys Ala Lys Ala Leu Tyr Arg Ser Cys Ile
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 Asp Lys Asn Ser Val Asn His Val Ile His Ile Asp Gln Pro Arg Leu  
 210 215 220  
 Gly Leu Pro Ser Arg Asp Tyr Tyr Glu Cys Thr Gly Ile Tyr Lys Glu  
 225 230 235 240  
 Ala Cys Thr Ala Tyr Val Asp Phe Met Ile Ser Val Ala Arg Leu Ile  
 245 250 255  
 Arg Gln Glu Glu Arg Leu Pro Ile Asp Glu Asn Gln Leu Ala Leu Glu  
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 275 280 285  
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 370 375 380  
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 Ala Gly Glu Ser Lys His Val Val Glu Asp Leu Ile Ala Gln Ile Arg  
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 Glu Val Phe Ile Gln Thr Leu Asp Asp Leu Thr Trp Met Asp Ala Glu  
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 675 680 685  
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<212> PRT

<213> Homo sapiens

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65 70 75 80

Phe Arg Phe Ala Cys Asp Gly Trp Ile Ser Asn Asn Pro Ile Pro Glu  
85 90 95

Asp Met Pro Ser Tyr Gly Val Tyr Pro Trp Leu Arg His Asn Val Asp  
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Leu Lys Leu Lys Glu Leu Leu Glu Lys Ser Ile Ser Arg Arg Arg Asp  
115 120 125

Thr Glu Ala Ile Gln Lys Ala Lys Ile Leu Tyr Ser Ser Cys Met Asn  
130 135 140

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165 170 175

Glu Gly Val Trp Ser Glu Arg Lys Phe Ser Leu Leu Gln Thr Leu Ala  
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Thr Phe Arg Gly Gln Tyr Ser Asn Ser Val Phe Ile Arg Leu Tyr Val  
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Ser Pro Asp Asp Lys Ala Ser Asn Glu His Ile Leu Lys Leu Asp Gln  
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Glu Ala Lys Ser Tyr Arg Asp Ala Leu Tyr Lys Phe Met Val Asp Thr  
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Ser Val Leu Arg Leu Glu Ile Lys Ile Ala Glu Ile Met Ile Pro His  
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Glu Asn Arg Thr Ser Glu Ala Met Tyr Asn Lys Met Asn Ile Ser Glu  
290 295 300

Leu Ser Ala Met Ile Pro Gln Phe Asp Trp Leu Gly Tyr Ile Lys Lys  
 305 310 315 320

Val Ile Asp Thr Arg Leu Tyr Pro His Leu Lys Asp Ile Ser Pro Ser  
 325 330 335

Glu Asn Val Val Val Arg Val Pro Gln Tyr Phe Lys Asp Leu Phe Arg  
 340 345 350

Ile Leu Gly Ser Glu Arg Lys Lys Thr Ile Ala Asn Tyr Leu Val Trp  
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Arg Met Val Tyr Ser Arg Ile Pro Asn Leu Ser Arg Arg Phe Gln Tyr  
 370 375 380

Arg Trp Leu Glu Phe Ser Arg Val Ile Gln Gly Thr Thr Thr Leu Leu  
 385 390 395 400

Pro Gln Trp Asp Lys Cys Val Asn Phe Ile Glu Ser Ala Leu Pro Tyr  
 405 410 415

Val Val Gly Lys Met Phe Val Asp Val Tyr Phe Gln Glu Asp Lys Lys  
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Glu Met Met Glu Glu Leu Val Glu Gly Val Arg Trp Ala Phe Ile Asp  
 435 440 445

Met Leu Glu Lys Glu Asn Glu Trp Met Asp Ala Gly Thr Lys Arg Lys  
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Phe Ser Glu Ala Asp Tyr Phe Gly Asn Val Leu Gln Thr Arg Lys Tyr  
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Tyr Asp Lys Asn Gly Asn Leu Asp Pro Trp Trp Ser Thr Glu Ser Glu  
 595 600 605

Glu Lys Phe Lys Glu Lys Thr Lys Cys Met Ile Asn Gln Tyr Ser Asn  
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 Tyr Arg Lys Trp Ile Asn Asp Arg Arg Gln Gly Leu Glu Glu Pro Leu  
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 675 680 685  
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 35 40 45  
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 50 55 60  
 Leu Phe Tyr Asn Phe Gln Asn Cys Gly Pro Arg Pro Cys Glu Thr Ser  
 65 70 75 80  
 Val Cys Leu Asp Leu Arg Asp His Tyr Leu Ala Ser Gly Asn Thr Ser  
 85 90 95  
 Val Ala Pro Cys Thr Asp Phe Phe Ser Phe Ala Cys Gly Arg Ala Lys  
 100 105 110  
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115								120							125
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Glu	Glu	Lys	Ala	Phe	Gln	Phe	Tyr	Asn	Ser	Cys	Met	Asp	Thr	Leu	Ala
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Ile	Glu	Ala	Ala	Gly	Thr	Gly	Pro	Leu	Arg	Gln	Val	Ile	Glu	Glu	Leu
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Gly	Gly	Trp	Arg	Ile	Ser	Gly	Lys	Trp	Thr	Ser	Leu	Asn	Phe	Asn	Arg
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Thr	Leu	Arg	Leu	Leu	Met	Ser	Gln	Tyr	Gly	His	Phe	Pro	Phe	Phe	Arg
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435    440    445

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Ala Ser Glu Trp Ala Leu Lys Pro Glu Leu Ala Arg Gln Glu Tyr Asn  
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Arg Ser Leu Arg Ala Arg Ile Val Gln Ser Phe Leu Gln Pro His Pro  
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Gln His Arg Trp Lys Val Ser Pro Trp Asp Val Asn Ala Tyr Tyr Ser  
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Val Ser Asp His Val Val Val Phe Pro Ala Gly Leu Leu Gln Pro Pro  
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Phe Phe His Pro Gly Tyr Pro Arg Ala Val Asn Phe Gly Ala Ala Gly  
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Ser Ile Met Ala His Glu Leu Leu His Ile Phe Tyr Gln Leu Leu Leu  
580    585    590

Pro Gly Gly Cys Leu Ala Cys Asp Asn His Ala Leu Gln Glu Ala His  
595    600    605

Leu Cys Leu Lys Arg His Tyr Ala Ala Phe Pro Leu Pro Ser Arg Thr  
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Ser Phe Asn Asp Ser Leu Thr Phe Leu Glu Asn Ala Ala Asp Val Gly  
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Gly Leu Ala Ile Ala Leu Gln Ala Tyr Ser Lys Arg Leu Leu Arg His  
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His Gly Glu Thr Val Leu Pro Ser Leu Asp Leu Ser Pro Gln Gln Ile  
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Phe Phe Arg Ser Tyr Ala Gln Val Met Cys Arg Lys Pro Ser Pro Gln  
675    680    685

Asp Ser His Asp Thr His Ser Pro Pro His Leu Arg Val His Gly Pro  
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 <213> Homo sapiens

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His	Ser	Pro	Arg	Ser	Gly	Gln	Arg	Cys	Trp	Ala	Ala	Arg	Thr	Gln	Val
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Glu	Lys	Arg	Leu	Val	Val	Leu	Val	Val	Leu	Leu	Ala	Ala	Gly	Leu	Val
	50					55					60				
Ala	Cys	Leu	Ala	Ala	Leu	Gly	Ile	Gln	Tyr	Gln	Thr	Arg	Ser	Pro	Ser
65					70					75					80
Val	Cys	Leu	Ser	Glu	Ala	Cys	Val	Ser	Val	Thr	Ser	Ser	Ile	Leu	Ser
				85					90					95	
Ser	Met	Asp	Pro	Thr	Val	Asp	Pro	Cys	His	Asp	Phe	Phe	Ser	Tyr	Ala
			100					105					110		
Cys	Gly	Gly	Trp	Ile	Lys	Ala	Asn	Pro	Val	Pro	Asp	Gly	His	Ser	Arg
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Trp	Gly	Thr	Phe	Ser	Asn	Leu	Trp	Glu	His	Asn	Gln	Ala	Ile	Ile	Lys
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His	Leu	Leu	Glu	Asn	Ser	Thr	Ala	Ser	Val	Ser	Glu	Ala	Glu	Arg	Lys
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		195					200					205			
Val	Val	Thr	Ala	His	Tyr	Arg	Thr	Ser	Pro	Phe	Phe	Ser	Val	Tyr	Val
	210					215					220				
Ser	Ala	Asp	Ser	Lys	Asn	Ser	Asn	Ser	Asn	Val	Ile	Gln	Val	Asp	Gln
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Ser	Gly	Leu	Gly	Leu	Pro	Ser	Arg	Asp	Tyr	Tyr	Leu	Asn	Lys	Thr	Glu
				245					250					255	

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Lys Leu Leu Gly Gly Gly Asp Glu Glu Ala Ile Arg Pro Gln Met Gln  
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Gln Ile Leu Asp Phe Glu Thr Ala Leu Ala Asn Ile Thr Ile Pro Gln  
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Tyr Asp Lys Glu Tyr Leu Glu Gln Ile Ser Thr Leu Ile Asn Thr Thr  
 355 360 365

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Phe Cys Val Ser Asp Thr Glu Asn Asn Leu Gly Phe Ala Leu Gly Pro  
 420 425 430

Met Phe Val Lys Ala Thr Phe Ala Glu Asp Ser Lys Ser Ile Ala Thr  
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Glu Ile Ile Leu Glu Ile Lys Lys Ala Phe Glu Glu Ser Leu Ser Thr  
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Leu Lys Trp Met Asp Glu Glu Thr Arg Lys Ser Ala Lys Glu Lys Ala  
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Tyr Phe Glu Asn Ala Met Arg Phe Phe Asn Phe Ser Trp Arg Val Thr  
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 Ser Ser His Glu Gly Leu Ile Thr Asp Pro His Ser Pro Ser Arg Phe  
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 Arg Val Ile Gly Ser Leu Ser Asn Ser Lys Glu Phe Ser Glu His Phe  
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Trp

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primers for RT-PCR reactions

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<210> 6

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<212> DNA

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Met Val Glu Arg Ala Gly Trp  
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Trp	Glu	Leu	Glu	Arg	Gln	Leu	Ala	Val	Leu	Asn	Ser	Gln	Phe	Asn	Arg	
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cgg	gtc	ctc	atc	gac	ctc	ttc	atc	tgg	aat	gac	gac	cag	aac	tcc	agc	1024
Arg	Val	Leu	Ile	Asp	Leu	Phe	Ile	Trp	Asn	Asp	Asp	Gln	Asn	Ser	Ser	
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Arg	His	Val	Ile	Tyr	Ile	Asp	Gln	Pro	Thr	Leu	Gly	Met	Pro	Ser	Arg	
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gag	tac	tat	ttc	cag	gag	gac	aac	aac	cac	aag	gta	cgg	aaa	gcc	tac	1120
Glu	Tyr	Tyr	Phe	Gln	Glu	Asp	Asn	Asn	His	Lys	Val	Arg	Lys	Ala	Tyr	
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Leu	Glu	Phe	Met	Thr	Ser	Val	Ala	Thr	Met	Leu	Arg	Lys	Asp	Gln	Asn	
	265					270					275					
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Leu	Ser	Lys	Glu	Ser	Ala	Met	Val	Arg	Glu	Glu	Met	Ala	Glu	Val	Leu	
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gaa	ctg	gag	acg	cat	ctg	gcc	aac	gcc	aca	gtc	ccc	cag	gag	aaa	agg	1264
Glu	Leu	Glu	Thr	His	Leu	Ala	Asn	Ala	Thr	Val	Pro	Gln	Glu	Lys	Arg	
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His	Asp	Val	Thr	Ala	Leu	Tyr	His	Arg	Met	Asp	Leu	Met	Glu	Leu	Gln	
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gaa	agg	ttt	ggt	ctg	aag	ggg	ttt	aac	tgg	act	ctc	ttc	ata	caa	aac	1360
Glu	Arg	Phe	Gly	Leu	Lys	Gly	Phe	Asn	Trp	Thr	Leu	Phe	Ile	Gln	Asn	
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Val	Leu	Ser	Ser	Val	Glu	Val	Glu	Leu	Phe	Pro	Asp	Glu	Glu	Val	Val	
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Val	Tyr	Gly	Ile	Pro	Tyr	Leu	Glu	Asn	Leu	Glu	Asp	Ile	Ile	Asp	Ser	
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Tyr	Ser	Ala	Arg	Thr	Met	Gln	Asn	Tyr	Leu	Val	Trp	Arg	Leu	Val	Leu	
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gat	cga	att	ggc	agc	ctg	agc	cag	aga	ttc	aaa	gag	gcg	cgt	gtg	gac	1552
Asp	Arg	Ile	Gly	Ser	Leu	Ser	Gln	Arg	Phe	Lys	Glu	Ala	Arg	Val	Asp	
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Tyr Arg Lys Ala Leu Tyr Gly Thr Thr Val Glu Glu Val Arg Trp Arg	
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Glu Cys Val Ser Tyr Val Asn Ser Asn Met Glu Ser Ala Val Gly Ser	
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Leu Tyr Ile Lys Arg Ala Phe Ser Lys Asp Ser Lys Ser Thr Val Arg	
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Glu Leu Ile Glu Lys Ile Arg Ser Val Phe Val Asp Asn Leu Asp Glu	
460 465 470	
ctg aac tgg atg gac gag gaa tcc aag aag aag gcc cag gaa aag gcc	1792
Leu Asn Trp Met Asp Glu Glu Ser Lys Lys Lys Ala Gln Glu Lys Ala	
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Met Asn Ile Arg Glu Gln Ile Gly Tyr Pro Asp Tyr Ile Leu Glu Asp	
490 495 500	
aac aat aaa cac ctg gat gag gaa tac tcc agt ttg act ttc tat gag	1888
Asn Asn Lys His Leu Asp Glu Glu Tyr Ser Ser Leu Thr Phe Tyr Glu	
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gac ctg tat ttt gag aac gga ctt cag aac ctc aag aac aat gcc cag	1936
Asp Leu Tyr Phe Glu Asn Gly Leu Gln Asn Leu Lys Asn Asn Ala Gln	
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Arg Ser Leu Lys Lys Leu Arg Glu Lys Val Asp Gln Asn Leu Trp Ile	
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Ile Gly Ala Ala Val Val Asn Ala Phe Tyr Ser Pro Asn Arg Asn Gln	
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Gln Pro Gln Ser Leu Asn Phe Gly Gly Ile Gly Met Val Ile Gly His	
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gag atc aca cac ggc ttt gat gat aat ggt cgt aac ttt gac aag aac	2176
Glu Ile Thr His Gly Phe Asp Asp Asn Gly Arg Asn Phe Asp Lys Asn	
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Gly Asn Met Leu Asp Trp Trp Ser Asn Phe Ser Ala Arg His Phe Gln	
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Trp Leu Ala Asp Gly Gly Lys Asp Gln Arg Leu Pro Gly Leu Asn Leu  
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acc tat gcc cag ctt ttc ttc atc aac tat gcc cag gtg tgg tgt ggg 2464  
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Lys Arg Cys Arg Ile Trp  
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Val	Ile	Ala	Ala	Ala	Arg	Ile	Leu	Glu	Asn	Met	Asp	Gln	Ser	Arg	Asn
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Pro	Cys	Glu	Asn	Phe	Tyr	Gln	Tyr	Ala	Cys	Gly	Gly	Trp	Leu	Arg	His
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His	Val	Ile	Pro	Glu	Thr	Asn	Ser	Arg	Tyr	Ser	Val	Phe	Asp	Ile	Leu
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Cys	Met	Asn	Gln	Ser	Val	Ile	Glu	Lys	Arg	Asp	Ser	Glu	Pro	Leu	Leu
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Ser	Val	Leu	Lys	Met	Val	Gly	Gly	Trp	Pro	Val	Ala	Met	Asp	Lys	Trp
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Asn	Glu	Thr	Met	Gly	Leu	Lys	Trp	Glu	Leu	Glu	Arg	Gln	Leu	Ala	Val
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Leu	Asn	Ser	Gln	Phe	Asn	Arg	Arg	Val	Leu	Ile	Asp	Leu	Phe	Ile	Trp
	210					215					220				
Asn	Asp	Asp	Gln	Asn	Ser	Ser	Arg	His	Val	Ile	Tyr	Ile	Asp	Gln	Pro
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Thr	Leu	Gly	Met	Pro	Ser	Arg	Glu	Tyr	Tyr	Phe	Gln	Glu	Asp	Asn	Asn
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His	Lys	Val	Arg	Lys	Ala	Tyr	Leu	Glu	Phe	Met	Thr	Ser	Val	Ala	Thr
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Glu	Glu	Met	Ala	Glu	Val	Leu	Glu	Leu	Glu	Thr	His	Leu	Ala	Asn	Ala
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Thr	Val	Pro	Gln	Glu	Lys	Arg	His	Asp	Val	Thr	Ala	Leu	Tyr	His	Arg
305					310					315					320
Met	Asp	Leu	Met	Glu	Leu	Gln	Glu	Arg	Phe	Gly	Leu	Lys	Gly	Phe	Asn





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Val Cys Thr Thr Pro Gly Cys Val Ile Ala Ala Ala Arg Ile Leu Gln	
80 85 90	
aac atg gac ccg acc acg gaa ccg tgt gac gac ttc tac cag ttt gca	336
Asn Met Asp Pro Thr Thr Glu Pro Cys Asp Asp Phe Tyr Gln Phe Ala	
95 100 105 110	
tgc gga ggc tgg ctg cgg cgc cac gtg atc cct gag acc aac tca aga	384
Cys Gly Gly Trp Leu Arg Arg His Val Ile Pro Glu Thr Asn Ser Arg	
115 120 125	
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Tyr Ser Ile Phe Asp Val Leu Arg Asp Glu Leu Glu Val Ile Leu Lys	
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Ala Val Leu Glu Asn Ser Thr Ala Lys Asp Arg Pro Ala Val Glu Lys	
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gcc agg acg ctg tac cgc tcc tgc atg aac cag agt gtg ata gag aag	528
Ala Arg Thr Leu Tyr Arg Ser Cys Met Asn Gln Ser Val Ile Glu Lys	
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Arg Gly Ser Gln Pro Leu Leu Asp Ile Leu Glu Val Val Gly Gly Trp	
175 180 185 190	
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Pro Val Ala Met Asp Arg Trp Asn Glu Thr Val Gly Leu Glu Trp Glu	
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Leu Glu Arg Gln Leu Ala Leu Met Asn Ser Gln Phe Asn Arg Arg Val	
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Leu Ile Asp Leu Phe Ile Trp Asn Asp Asp Gln Asn Ser Ser Arg His	
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Tyr Phe Asn Gly Gly Ser Asn Arg Lys Val Arg Glu Ala Tyr Leu Gln	
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Phe Met Val Ser Val Ala Thr Leu Leu Arg Glu Asp Ala Asn Leu Pro	
275 280 285	
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Arg Asp Ser Cys Leu Val Gln Glu Asp Met Val Gln Val Leu Glu Leu	
290 295 300	

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Phe	Gly	Leu	Lys	Gly	Phe	Asn	Trp	Thr	Leu	Phe	Ile	Gln	Thr	Val	Leu	
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Ser	Ser	Val	Lys	Ile	Lys	Leu	Leu	Pro	Asp	Glu	Glu	Val	Val	Val	Tyr	
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Gly	Ile	Pro	Tyr	Leu	Gln	Asn	Leu	Glu	Asn	Ile	Ile	Asp	Thr	Tyr	Ser	
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Ala	Arg	Thr	Ile	Gln	Asn	Tyr	Leu	Val	Trp	Arg	Leu	Val	Leu	Asp	Arg	
		385						390					395			
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Ile	Gly	Ser	Leu	Ser	Gln	Arg	Phe	Lys	Asp	Thr	Arg	Val	Asn	Tyr	Arg	
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Lys	Ala	Leu	Phe	Gly	Thr	Met	Val	Glu	Glu	Val	Arg	Trp	Arg	Glu	Cys	
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Val	Gly	Tyr	Val	Asn	Ser	Asn	Met	Glu	Asn	Ala	Val	Gly	Ser	Leu	Tyr	
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gtc	agg	gag	gcg	ttc	cct	gga	gac	agc	aag	agc	atg	gtc	aga	gaa	ctc	1392
Val	Arg	Glu	Ala	Phe	Pro	Gly	Asp	Ser	Lys	Ser	Met	Val	Arg	Glu	Leu	
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Ile	Asp	Lys	Val	Arg	Thr	Val	Phe	Val	Glu	Thr	Leu	Asp	Glu	Leu	Gly	
		465						470							475	
tgg	atg	gac	gag	gag	tcc	aag	aag	aag	gcg	cag	gag	aag	gcc	atg	agc	1488
Trp	Met	Asp	Glu	Glu	Ser	Lys	Lys	Lys	Ala	Gln	Glu	Lys	Ala	Met	Ser	
		480						485							490	
atc	cgg	gag	cag	atc	ggg	cac	cct	gac	tac	atc	ctg	gag	gag	atg	aac	1536
Ile	Arg	Glu	Gln	Ile	Gly	His	Pro	Asp	Tyr	Ile	Leu	Glu	Glu	Met	Asn	
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agg	cgc	ctg	gac	gag	gag	tac	tcc	aat	ctg	aac	ttc	tca	gag	gac	ctg	1584
Arg	Arg	Leu	Asp	Glu	Glu	Tyr	Ser	Asn	Leu	Asn	Phe	Ser	Glu	Asp	Leu	
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tac	ttt	gag	aac	agt	ctg	cag	aac	ctc	aag	gtg	ggc	gcc	cag	cgg	agc	1632



Tyr	Phe	Glu	Asn	Ser	Leu	Gln	Asn	Leu	Lys	Val	Gly	Ala	Gln	Arg	Ser		
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Leu	Arg	Lys	Leu	Arg	Glu	Lys	Val	Asp	Pro	Asn	Leu	Trp	Ile	Ile	Gly		
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Ala	Ala	Val	Val	Asn	Ala	Phe	Tyr	Ser	Pro	Asn	Arg	Asn	Gln	Ile	Val		
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Phe	Pro	Ala	Gly	Ile	Leu	Gln	Pro	Pro	Phe	Phe	Ser	Lys	Glu	Gln	Pro		
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cag	gcc	ttg	aac	ttt	gga	ggc	att	ggg	atg	gtg	atc	ggg	cac	gag	atc	1824	
Gln	Ala	Leu	Asn	Phe	Gly	Gly	Ile	Gly	Met	Val	Ile	Gly	His	Glu	Ile		
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Thr	His	Gly	Phe	Asp	Asp	Asn	Gly	Arg	Asn	Phe	Asp	Lys	Asn	Gly	Asn		
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Met	Met	Asp	Trp	Trp	Ser	Asn	Phe	Ser	Thr	Gln	His	Phe	Arg	Glu	Gln		
		625					630					635					
tca	gag	tgc	atg	atc	tac	cag	tac	ggc	aac	tac	tcc	tgg	gac	ctg	gca	1968	
Ser	Glu	Cys	Met	Ile	Tyr	Gln	Tyr	Gly	Asn	Tyr	Ser	Trp	Asp	Leu	Ala		
	640					645					650						
gac	gaa	cag	aac	gtg	aac	gga	ttc	aac	acc	ctt	ggg	gaa	aac	att	gct	2016	
Asp	Glu	Gln	Asn	Val	Asn	Gly	Phe	Asn	Thr	Leu	Gly	Glu	Asn	Ile	Ala		
655					660					665					670		
gac	aac	gga	ggg	gtg	cgg	caa	gcc	tat	aag	gcc	tac	ctc	aag	tgg	atg	2064	
Asp	Asn	Gly	Gly	Val	Arg	Gln	Ala	Tyr	Lys	Ala	Tyr	Leu	Lys	Trp	Met		
			675					680						685			
gca	gag	ggt	ggc	aag	gac	cag	cag	ctg	ccc	ggc	ctg	gat	ctc	acc	cat	2112	
Ala	Glu	Gly	Gly	Lys	Asp	Gln	Gln	Leu	Pro	Gly	Leu	Asp	Leu	Thr	His		
			690					695						700			
gag	cag	ctc	ttc	ttc	atc	aac	tat	gcc	cag	gtg	tgg	tgc	ggg	tcc	tac	2160	
Glu	Gln	Leu	Phe	Phe	Ile	Asn	Tyr	Ala	Gln	Val	Trp	Cys	Gly	Ser	Tyr		
		705					710						715				
cgg	ccc	gag	ttc	gcc	atc	caa	tcc	atc	aag	aca	gac	gtc	cac	agt	ccc	2208	
Arg	Pro	Glu	Phe	Ala	Ile	Gln	Ser	Ile	Lys	Thr	Asp	Val	His	Ser	Pro		
		720				725						730					
ctg	aag	tac	agg	gta	ctg	ggg	tcg	ctg	cag	aac	ctg	gcc	gcc	ttc	gca	2256	
Leu	Lys	Tyr	Arg	Val	Leu	Gly	Ser	Leu	Gln	Asn	Leu	Ala	Ala	Phe	Ala		
735					740				745						750		
gac	acg	ttc	cac	tgt	gcc	cgg	ggc	acc	ccc	atg	cac	ccc	aag	gag	cga	2304	
Asp	Thr	Phe	His	Cys	Ala	Arg	Gly	Thr	Pro	Met	His	Pro	Lys	Glu	Arg		

755

760

765

tgc cgc gtg tgg tagccaaggc cctgccgcgc tgtgcggccc acgcccaccc 2356  
 Cys Arg Val Trp  
 770

gctgctcgga ggcattctgtg cgaaggtgca gctagcggcg acccagtgta cgtccccgcc 2416

cggccaacca tgccaagcct gectgccagg cctctgcgcc tggcctaggg tgcagccacc 2476

tgcttgacac ccagggatga gcagtgtcca gtgcagtacc tggaccggag cccccttcac 2536

agacaccgc ggggctcagt gccccgtca caactctgta gagacaatca actgtgtcct 2596

gccaccctt caaggtgcat tgtcttccag tatctacagc ttcagaactt gagctaagta 2656

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<211> 770

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<213> Homo sapiens

<400> 15

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Ala Leu Gly Val Leu Tyr Ala Asp Arg Arg Gly Lys Gln Leu Pro Arg  
 35 40 45

Leu Ala Ser Arg Leu Cys Phe Leu Gln Glu Glu Arg Thr Phe Val Lys  
 50 55 60

Arg Lys Pro Arg Gly Ile Pro Glu Ala Gln Glu Val Ser Glu Val Cys  
 65 70 75 80

Thr Thr Pro Gly Cys Val Ile Ala Ala Ala Arg Ile Leu Gln Asn Met  
 85 90 95

Asp Pro Thr Thr Glu Pro Cys Asp Asp Phe Tyr Gln Phe Ala Cys Gly  
 100 105 110

Gly Trp Leu Arg Arg His Val Ile Pro Glu Thr Asn Ser Arg Tyr Ser  
 115 120 125

Ile Phe Asp Val Leu Arg Asp Glu Leu Glu Val Ile Leu Lys Ala Val  
 130 135 140

Leu Glu Asn Ser Thr Ala Lys Asp Arg Pro Ala Val Glu Lys Ala Arg  
 145 150 155 160

Thr Leu Tyr Arg Ser Cys Met Asn Gln Ser Val Ile Glu Lys Arg Gly  
 165 170 175

Ser Gln Pro Leu Leu Asp Ile Leu Glu Val Val Gly Gly Trp Pro Val  
 180 185 190

Ala Met Asp Arg Trp Asn Glu Thr Val Gly Leu Glu Trp Glu Leu Glu  
 195 200 205

Arg Gln Leu Ala Leu Met Asn Ser Gln Phe Asn Arg Arg Val Leu Ile  
 210 215 220

Asp Leu Phe Ile Trp Asn Asp Asp Gln Asn Ser Ser Arg His Ile Ile  
 225 230 235 240

Tyr Ile Asp Gln Pro Thr Leu Gly Met Pro Ser Arg Glu Tyr Tyr Phe  
 245 250 255

Asn Gly Gly Ser Asn Arg Lys Val Arg Glu Ala Tyr Leu Gln Phe Met  
 260 265 270

Val Ser Val Ala Thr Leu Leu Arg Glu Asp Ala Asn Leu Pro Arg Asp  
 275 280 285

Ser Cys Leu Val Gln Glu Asp Met Val Gln Val Leu Glu Leu Glu Thr  
 290 295 300

Gln Leu Ala Lys Ala Thr Val Pro Gln Glu Glu Arg His Asp Val Ile  
 305 310 315 320

Ala Leu Tyr His Arg Met Gly Leu Glu Glu Leu Gln Ser Gln Phe Gly  
 325 330 335

Leu Lys Gly Phe Asn Trp Thr Leu Phe Ile Gln Thr Val Leu Ser Ser  
 340 345 350

Val Lys Ile Lys Leu Leu Pro Asp Glu Glu Val Val Val Tyr Gly Ile  
 355 360 365

Pro Tyr Leu Gln Asn Leu Glu Asn Ile Ile Asp Thr Tyr Ser Ala Arg  
 370 375 380

Thr Ile Gln Asn Tyr Leu Val Trp Arg Leu Val Leu Asp Arg Ile Gly  
 385 390 395 400

Ser Leu Ser Gln Arg Phe Lys Asp Thr Arg Val Asn Tyr Arg Lys Ala  
 405 410 415

Leu Phe Gly Thr Met Val Glu Glu Val Arg Trp Arg Glu Cys Val Gly  
 420 425 430

Tyr Val Asn Ser Asn Met Glu Asn Ala Val Gly Ser Leu Tyr Val Arg  
 435 440 445

Glu Ala Phe Pro Gly Asp Ser Lys Ser Met Val Arg Glu Leu Ile Asp  
 450 455 460

Lys Val Arg Thr Val Phe Val Glu Thr Leu Asp Glu Leu Gly Trp Met  
 465 470 475 480

Asp Glu Glu Ser Lys Lys Lys Ala Gln Glu Lys Ala Met Ser Ile Arg  
 485 490 495

Glu Gln Ile Gly His Pro Asp Tyr Ile Leu Glu Glu Met Asn Arg Arg  
 500 505 510

Leu Asp Glu Glu Tyr Ser Asn Leu Asn Phe Ser Glu Asp Leu Tyr Phe  
 515 520 525

Glu Asn Ser Leu Gln Asn Leu Lys Val Gly Ala Gln Arg Ser Leu Arg  
 530 535 540

Lys Leu Arg Glu Lys Val Asp Pro Asn Leu Trp Ile Ile Gly Ala Ala  
 545 550 555 560

Val Val Asn Ala Phe Tyr Ser Pro Asn Arg Asn Gln Ile Val Phe Pro  
 565 570 575

Ala Gly Ile Leu Gln Pro Pro Phe Phe Ser Lys Glu Gln Pro Gln Ala  
 580 585 590

Leu Asn Phe Gly Gly Ile Gly Met Val Ile Gly His Glu Ile Thr His  
 595 600 605

Gly Phe Asp Asp Asn Gly Arg Asn Phe Asp Lys Asn Gly Asn Met Met  
 610 615 620

Asp Trp Trp Ser Asn Phe Ser Thr Gln His Phe Arg Glu Gln Ser Glu  
 625 630 635 640

Cys Met Ile Tyr Gln Tyr Gly Asn Tyr Ser Trp Asp Leu Ala Asp Glu  
 645 650 655

Gln Asn Val Asn Gly Phe Asn Thr Leu Gly Glu Asn Ile Ala Asp Asn  
 660 665 670

Gly Gly Val Arg Gln Ala Tyr Lys Ala Tyr Leu Lys Trp Met Ala Glu  
 675 680 685

Gly Gly Lys Asp Gln Gln Leu Pro Gly Leu Asp Leu Thr His Glu Gln  
 690 695 700

Leu Phe Phe Ile Asn Tyr Ala Gln Val Trp Cys Gly Ser Tyr Arg Pro  
 705 710 715 720

Glu Phe Ala Ile Gln Ser Ile Lys Thr Asp Val His Ser Pro Leu Lys  
 725 730 735

Tyr Arg Val Leu Gly Ser Leu Gln Asn Leu Ala Ala Phe Ala Asp Thr  
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Phe His Cys Ala Arg Gly Thr Pro Met His Pro Lys Glu Arg Cys Arg  
 755 760 765

Val Trp  
 770

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gcgaggcccc acgaggaggc cggcggccac gcgcatcccc tagcccaggt ggcccaggtc 180  
tgcaccgctg cggcctcggc gccg atg gag ccc ccg tat tgc ctg acg gcg 231  
Met Glu Pro Pro Tyr Ser Leu Thr Ala  
1 5  
cac tac gat gag ttc caa gag gtc aag tac gtg agc cgc tgc ggc gcg 279  
His Tyr Asp Glu Phe Gln Glu Val Lys Tyr Val Ser Arg Cys Gly Ala  
10 15 20 25  
ggg ggc gcg cgc ggg gcc tcc ctg ccc ccg ggc ttc ccg ttg ggc gct 327  
Gly Gly Ala Arg Gly Ala Ser Leu Pro Pro Gly Phe Pro Leu Gly Ala  
30 35 40  
gcg cgc agc gcc acc ggg gcc cgg tcc ggg ctg ccg cgc tgg aac cgg 375  
Ala Arg Ser Ala Thr Gly Ala Arg Ser Gly Leu Pro Arg Trp Asn Arg  
45 50 55  
cgc gag gtg tgc ctg ctg tgc ggg ctg gtg ttc gcc gcc ggc etc tgc 423  
Arg Glu Val Cys Leu Leu Ser Gly Leu Val Phe Ala Ala Gly Leu Cys  
60 65 70  
gcc att ctg gcg gct atg ctg gcc ctc aag tac ctg ggc ccg gtc gcg 471  
Ala Ile Leu Ala Ala Met Leu Ala Leu Lys Tyr Leu Gly Pro Val Ala  
75 80 85  
gcc ggc ggc ggc gcc tgt ccc gag ggc tgc cct gag cgc aag gcc ttc 519  
Ala Gly Gly Gly Ala Cys Pro Glu Gly Cys Pro Glu Arg Lys Ala Phe  
90 95 100 105  
gcg cgc gcc gct cgc ttc ctg gcc gcc aac ctg gac gcc agc atc gac 567  
Ala Arg Ala Ala Arg Phe Leu Ala Ala Asn Leu Asp Ala Ser Ile Asp  
110 115 120  
cca tgc cag gac ttc tac tgc ttc gcc tgc ggc ggt tgg ctg cgg cgc 615  
Pro Cys Gln Asp Phe Tyr Ser Phe Ala Cys Gly Gly Trp Leu Arg Arg  
125 130 135  
cac gcc atc ccc gac gac aag ctc acc tat ggc acc atc gcg gca atc 663  
His Ala Ile Pro Asp Asp Lys Leu Thr Tyr Gly Thr Ile Ala Ala Ile

140				145				150						
ggc gag caa aac gag gag cgc cta cgg cgc ctg ctg gcg cgg ccc ggg	Gly Glu Gln Asn Glu Glu Arg Leu Arg Arg Leu Leu Ala Arg Pro Gly	155	160	165									711	
ggt ggg cct ggc ggc gcg gcc cag cgc aag gtg cgc gcc ttc ttc cgc	Gly Gly Pro Gly Gly Ala Ala Gln Arg Lys Val Arg Ala Phe Phe Arg	170	175	180									759	
tcg tgc ctc gac atg cgc gag atc gag cga ctg ggc ccg cga ccc atg	Ser Cys Leu Asp Met Arg Glu Ile Glu Arg Leu Gly Pro Arg Pro Met		190	195								200	807	
cta gag gtc atc gag gac tgc ggg ggc tgg gac ctg ggc ggc gcg gag	Leu Glu Val Ile Glu Asp Cys Gly Gly Trp Asp Leu Gly Gly Ala Glu		205	210								215	855	
gag cgt ccg ggg gtc gcg gcg cga tgg gac ctc aac cgg ctg ctg tac	Glu Arg Pro Gly Val Ala Ala Arg Trp Asp Leu Asn Arg Leu Leu Tyr		220	225								230	903	
aag gcg cag ggc gtg tac agc gcc gcc gcg ctc ttc tcg ctc acg gtc	Lys Ala Gln Gly Val Tyr Ser Ala Ala Ala Leu Phe Ser Leu Thr Val		235	240								245	951	
agc ctg gac gac agg aac tcc tcg cgc tac gtc atc cgc att gac cag	Ser Leu Asp Asp Arg Asn Ser Ser Arg Tyr Val Ile Arg Ile Asp Gln		250	255								260	265	999
gat ggg ctc acc ctg cca gag agg acc ctg tac ctc gct cag gat gag	Asp Gly Leu Thr Leu Pro Glu Arg Thr Leu Tyr Leu Ala Gln Asp Glu		270	275								280	1047	
gac agt gag aag gtc ctg gca gca tac agg gtg ttc atg gag cga gtg	Asp Ser Glu Lys Val Leu Ala Ala Tyr Arg Val Phe Met Glu Arg Val		285	290								295	1095	
ctc agc ctc ctg ggt gca gac gct gtg gaa cag aag gcc caa gag atc	Leu Ser Leu Leu Gly Ala Asp Ala Val Glu Gln Lys Ala Gln Glu Ile		300	305								310	1143	
ctg caa gtg gag cag cag ctg gcc aac atc act gtg tca gag tat gac	Leu Gln Val Glu Gln Gln Leu Ala Asn Ile Thr Val Ser Glu Tyr Asp		315	320								325	1191	
gac cta cgg cga gat gtc agc tcc atg tac aac aag gtg acg ctg ggg	Asp Leu Arg Arg Asp Val Ser Ser Met Tyr Asn Lys Val Thr Leu Gly		330	335								340	345	1239
cag ctg cag aag atc acc ccc cac ttg cgg tgg aag tgg ctg cta gac	Gln Leu Gln Lys Ile Thr Pro His Leu Arg Trp Lys Trp Leu Leu Asp		350	355								360	1287	
cag atc ttc cag gag gac ttc tca gag gaa gag gag gtg gtg ctg ctg	Gln Ile Phe Gln Glu Asp Phe Ser Glu Glu Glu Glu Val Val Leu Leu		365	370								375	1335	

gcg aca gac tac atg cag cag gtg tcg cag ctc atc cgc tcc aca ccc	1383
Ala Thr Asp Tyr Met Gln Gln Val Ser Gln Leu Ile Arg Ser Thr Pro	
380 385 390	
cac cgg gtc ctg cac aac tac ctg gtg tgg cgc gtg gtg gtg gtc ctg	1431
His Arg Val Leu His Asn Tyr Leu Val Trp Arg Val Val Val Val Leu	
395 400 405	
agt gaa cac ctg tcc ccg cca ttc cgt gag gca ctg cac gag ctg gca	1479
Ser Glu His Leu Ser Pro Pro Phe Arg Glu Ala Leu His Glu Leu Ala	
410 415 420 425	
cag gag atg gag ggc agc gac aag cca cag gag ctg gcc cgg gtc tgc	1527
Gln Glu Met Glu Gly Ser Asp Lys Pro Gln Glu Leu Ala Arg Val Cys	
430 435 440	
ttg ggc cag gcc aat cgc cac ttt ggc atg gcg ctt ggc gcc ctc ttt	1575
Leu Gly Gln Ala Asn Arg His Phe Gly Met Ala Leu Gly Ala Leu Phe	
445 450 455	
gta cat gag cac ttc tca gct gcc agc aaa gcc aag gtg cag cag cta	1623
Val His Glu His Phe Ser Ala Ala Ser Lys Ala Lys Val Gln Gln Leu	
460 465 470	
gtg gaa gac atc aag tac atc ctg ggc cag cgc ctg gag gag ctg gac	1671
Val Glu Asp Ile Lys Tyr Ile Leu Gly Gln Arg Leu Glu Glu Leu Asp	
475 480 485	
tgg atg gac gcc gag acc agg gct gct gct cgg gcc aag ctc cag tac	1719
Trp Met Asp Ala Glu Thr Arg Ala Ala Ala Arg Ala Lys Leu Gln Tyr	
490 495 500 505	
atg atg gtg atg gtc ggc tac ccg gac ttc ctg ctg aaa ccc gat gct	1767
Met Met Val Met Val Gly Tyr Pro Asp Phe Leu Leu Lys Pro Asp Ala	
510 515 520	
gtg gac aag gag tat gag ttt gag gtc cat gag aag acc tac ttc aag	1815
Val Asp Lys Glu Tyr Glu Phe Glu Val His Glu Lys Thr Tyr Phe Lys	
525 530 535	
aac atc ttg aac agc atc cgc ttc agc atc cag ctc tca gtt aag aag	1863
Asn Ile Leu Asn Ser Ile Arg Phe Ser Ile Gln Leu Ser Val Lys Lys	
540 545 550	
att cgg cag gag gtg gac aag tcc acg tgg ctg ctc ccc cca cag gcg	1911
Ile Arg Gln Glu Val Asp Lys Ser Thr Trp Leu Leu Pro Pro Gln Ala	
555 560 565	
ctc aat gcc tac tat cta ccc aac aag aac cag atg gtg ttc ccc gcg	1959
Leu Asn Ala Tyr Tyr Leu Pro Asn Lys Asn Gln Met Val Phe Pro Ala	
570 575 580 585	
ggc atc ctg cag ccc acc ctg tac gac cct gac ttc cca cag tct ctc	2007
Gly Ile Leu Gln Pro Thr Leu Tyr Asp Pro Asp Phe Pro Gln Ser Leu	
590 595 600	

aac tac ggg ggc atc ggc acc atc att gga cat gag ctg acc cac ggc	2055
Asn Tyr Gly Gly Ile Gly Thr Ile Ile Gly His Glu Leu Thr His Gly	
605 610 615	
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Tyr Asp Asp Trp Gly Gly Gln Tyr Asp Arg Ser Gly Asn Leu Leu His	
620 625 630	
tgg tgg acg gag gcc tcc tac agc cgc ttc ctg cga aag gct gag tgc	2151
Trp Trp Thr Glu Ala Ser Tyr Ser Arg Phe Leu Arg Lys Ala Glu Cys	
635 640 645	
atc gtc cgt ctc tat gac aac ttc act gtc tac aac cag cgg gtg aac	2199
Ile Val Arg Leu Tyr Asp Asn Phe Thr Val Tyr Asn Gln Arg Val Asn	
650 655 660 665	
ggg aaa cac acg ctt ggg gag aac atc gca gat atg ggc ggc ctc aag	2247
Gly Lys His Thr Leu Gly Glu Asn Ile Ala Asp Met Gly Gly Leu Lys	
670 675 680	
ctg gcc tac cac gcc tat cag aag tgg gtg cgg gag cac ggc cca gag	2295
Leu Ala Tyr His Ala Tyr Gln Lys Trp Val Arg Glu His Gly Pro Glu	
685 690 695	
cac cca ctt ccc cgg ctc aag tac aca cat gac cag ctc ttc ttc att	2343
His Pro Leu Pro Arg Leu Lys Tyr Thr His Asp Gln Leu Phe Phe Ile	
700 705 710	
gcc ttt gcc cag aac tgg tgc atc aag cgg cgg tgc cag tcc atc tac	2391
Ala Phe Ala Gln Asn Trp Cys Ile Lys Arg Arg Ser Gln Ser Ile Tyr	
715 720 725	
ctg cag gtg ctg act gac aag cat gcc cct gag cac tac agg gtg ctg	2439
Leu Gln Val Leu Thr Asp Lys His Ala Pro Glu His Tyr Arg Val Leu	
730 735 740 745	
ggc agt gtg tcc cag ttt gag gag ttt ggc cgg gtt tta cac tgt cca	2487
Gly Ser Val Ser Gln Phe Glu Glu Phe Gly Arg Val Leu His Cys Pro	
750 755 760	
aag gtc tca ccc atg aac cct gcc cac aag tgt tcc gtg tgg	2529
Lys Val Ser Pro Met Asn Pro Ala His Lys Cys Ser Val Trp	
765 770 775	
tgaccctggc tgcccgcctg cacgccccca ctgccccgc acgaatcacc tctgctggc	2589
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cctccaggac cgggtccccc tgctgcccct cacttcagga ggggcctgga gcagggtgag	2709
gctggacttt ggggggctgt gagggaaata tactggggtc cccagattct gctctaaggg	2769
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<210> 17  
<211> 775  
<212> PRT  
<213> Homo sapiens

<400> 17

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Val	Lys	Tyr	Val	Ser	Arg	Cys	Gly	Ala	Gly	Gly	Ala	Arg	Gly	Ala	Ser	
			20					25					30			
Leu	Pro	Pro	Gly	Phe	Pro	Leu	Gly	Ala	Ala	Arg	Ser	Ala	Thr	Gly	Ala	
		35					40					45				
Arg	Ser	Gly	Leu	Pro	Arg	Trp	Asn	Arg	Arg	Glu	Val	Cys	Leu	Leu	Ser	
	50					55					60					
Gly	Leu	Val	Phe	Ala	Ala	Gly	Leu	Cys	Ala	Ile	Leu	Ala	Ala	Met	Leu	
65					70					75					80	
Ala	Leu	Lys	Tyr	Leu	Gly	Pro	Val	Ala	Ala	Gly	Gly	Gly	Ala	Cys	Pro	
				85					90					95		
Glu	Gly	Cys	Pro	Glu	Arg	Lys	Ala	Phe	Ala	Arg	Ala	Ala	Arg	Phe	Leu	
			100					105					110			
Ala	Ala	Asn	Leu	Asp	Ala	Ser	Ile	Asp	Pro	Cys	Gln	Asp	Phe	Tyr	Ser	
		115					120					125				
Phe	Ala	Cys	Gly	Gly	Trp	Leu	Arg	Arg	His	Ala	Ile	Pro	Asp	Asp	Lys	
130						135					140					
Leu	Thr	Tyr	Gly	Thr	Ile	Ala	Ala	Ile	Gly	Glu	Gln	Asn	Glu	Glu	Arg	
145					150					155					160	
Leu	Arg	Arg	Leu	Leu	Ala	Arg	Pro	Gly	Gly	Gly	Pro	Gly	Gly	Ala	Ala	
			165						170					175		
Gln	Arg	Lys	Val	Arg	Ala	Phe	Phe	Arg	Ser	Cys	Leu	Asp	Met	Arg	Glu	
			180					185					190			
Ile	Glu	Arg	Leu	Gly	Pro	Arg	Pro	Met	Leu	Glu	Val	Ile	Glu	Asp	Cys	
		195					200					205				
Gly	Gly	Trp	Asp	Leu	Gly	Gly	Ala	Glu	Glu	Arg	Pro	Gly	Val	Ala	Ala	
	210					215					220					
Arg	Trp	Asp	Leu	Asn	Arg	Leu	Leu	Tyr	Lys	Ala	Gln	Gly	Val	Tyr	Ser	
225					230					235					240	
Ala	Ala	Ala	Leu	Phe	Ser	Leu	Thr	Val	Ser	Leu	Asp	Asp	Arg	Asn	Ser	
				245					250					255		
Ser	Arg	Tyr	Val	Ile	Arg	Ile	Asp	Gln	Asp	Gly	Leu	Thr	Leu	Pro	Glu	
			260					265					270			

Arg Thr Leu Tyr Leu Ala Gln Asp Glu Asp Ser Glu Lys Val Leu Ala  
 275 280 285

Ala Tyr Arg Val Phe Met Glu Arg Val Leu Ser Leu Leu Gly Ala Asp  
 290 295 300

Ala Val Glu Gln Lys Ala Gln Glu Ile Leu Gln Val Glu Gln Gln Leu  
 305 310 315 320

Ala Asn Ile Thr Val Ser Glu Tyr Asp Asp Leu Arg Arg Asp Val Ser  
 325 330 335

Ser Met Tyr Asn Lys Val Thr Leu Gly Gln Leu Gln Lys Ile Thr Pro  
 340 345 350

His Leu Arg Trp Lys Trp Leu Leu Asp Gln Ile Phe Gln Glu Asp Phe  
 355 360 365

Ser Glu Glu Glu Glu Val Val Leu Leu Ala Thr Asp Tyr Met Gln Gln  
 370 375 380

Val Ser Gln Leu Ile Arg Ser Thr Pro His Arg Val Leu His Asn Tyr  
 385 390 395 400

Leu Val Trp Arg Val Val Val Val Leu Ser Glu His Leu Ser Pro Pro  
 405 410 415

Phe Arg Glu Ala Leu His Glu Leu Ala Gln Glu Met Glu Gly Ser Asp  
 420 425 430

Lys Pro Gln Glu Leu Ala Arg Val Cys Leu Gly Gln Ala Asn Arg His  
 435 440 445

Phe Gly Met Ala Leu Gly Ala Leu Phe Val His Glu His Phe Ser Ala  
 450 455 460

Ala Ser Lys Ala Lys Val Gln Gln Leu Val Glu Asp Ile Lys Tyr Ile  
 465 470 475 480

Leu Gly Gln Arg Leu Glu Glu Leu Asp Trp Met Asp Ala Glu Thr Arg  
 485 490 495

Ala Ala Ala Arg Ala Lys Leu Gln Tyr Met Met Val Met Val Gly Tyr  
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Pro Asp Phe Leu Leu Lys Pro Asp Ala Val Asp Lys Glu Tyr Glu Phe  
 515 520 525

Glu Val His Glu Lys Thr Tyr Phe Lys Asn Ile Leu Asn Ser Ile Arg  
 530 535 540

Phe Ser Ile Gln Leu Ser Val Lys Lys Ile Arg Gln Glu Val Asp Lys  
 545 550 555 560

Ser Thr Trp Leu Leu Pro Pro Gln Ala Leu Asn Ala Tyr Tyr Leu Pro  
 565 570 575

Asn Lys Asn Gln Met Val Phe Pro Ala Gly Ile Leu Gln Pro Thr Leu  
 580 585 590

Tyr Asp Pro Asp Phe Pro Gln Ser Leu Asn Tyr Gly Gly Ile Gly Thr  
 595 600 605

Ile Ile Gly His Glu Leu Thr His Gly Tyr Asp Asp Trp Gly Gly Gln  
 610 615 620

Tyr Asp Arg Ser Gly Asn Leu Leu His Trp Trp Thr Glu Ala Ser Tyr  
 625 630 635 640

Ser Arg Phe Leu Arg Lys Ala Glu Cys Ile Val Arg Leu Tyr Asp Asn  
 645 650 655

Phe Thr Val Tyr Asn Gln Arg Val Asn Gly Lys His Thr Leu Gly Glu  
 660 665 670

Asn Ile Ala Asp Met Gly Gly Leu Lys Leu Ala Tyr His Ala Tyr Gln  
 675 680 685

Lys Trp Val Arg Glu His Gly Pro Glu His Pro Leu Pro Arg Leu Lys  
 690 695 700

Tyr Thr His Asp Gln Leu Phe Phe Ile Ala Phe Ala Gln Asn Trp Cys  
 705 710 715 720

Ile Lys Arg Arg Ser Gln Ser Ile Tyr Leu Gln Val Leu Thr Asp Lys  
 725 730 735

His Ala Pro Glu His Tyr Arg Val Leu Gly Ser Val Ser Gln Phe Glu  
 740 745 750

Glu Phe Gly Arg Val Leu His Cys Pro Lys Val Ser Pro Met Asn Pro  
 755 760 765

Ala His Lys Cys Ser Val Trp  
 770 775